

Remarks.**Allowable subject matter.**

The Examiner has indicated that claims 15 and 16 would be allowable if rewritten in independent form.

Accordingly, Applicants in Amendment "A" amended claim 15 to incorporate all of the subject matter recited in claims 12, 14 and 15.

Claim rejections 35 USC103

In the Response to Arguments, the Examiner states "since it has been held that discovering an optimum value involves only routine skill in the art. " claims 1-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barnscheidt (3217426). This, however, is not the situation in the present invention. The present invention is based on the discovery that a concept that is well known in the art to increase heat transfer can also be used to minimize heat transfer. This concept is not only novel and useful, but it is also non-obvious. One skilled in the art would not look to

concepts for increasing heat transfer when the objective is to reduce heat transfer. He would instead look to concepts such as internal insulating materials, external coatings, thick condensate layers, reduced steam pressures, and dilution of steam with non-condensable insulating gases.

It is also of interest to note that the Appel and Hong patent (US 3,724,094) followed that of Barnscheidt. Its claims were granted based solely on the discovery of the optimum spacing for maximizing heat transfer. Clearly the USPTO did not consider this discovery of a maximum to be only routine skill in the art. The Appel and Hong patent continues to this day to be used as the basis for design of dryer bars for increasing heat transfer. The present invention as claimed is in the same field, but dealing with another discovery, this one being of the importance of bar spacing for reducing heat transfer.

Claims 1-3, 5-13 have been rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,564,494.

Also, as presented in Amendment "A":

US 5,564,494 to Salminen describes a dryer having a "roll insert 112" which "improves the heat transfer characteristics of the roll 102 both with regard to improved rate of heat transfer (both in the rimming condition and the stationary "puddle" forming condition), and with regard to greater uniformity of temperature at the outer surface of the roll side wall 104" (column 7, lines 6-14).

Accordingly, the '494 reference is silent regarding the claimed feature of "... transfer of thermal energy in said cross machine direction...." being "maximized...."

Additionally, the '494 reference does not teach the claimed feature of " transfer of thermal energy through said dryer shell from said inner to said outer surface" being " minimized".

Furthermore, the '494 reference teaches that the roll insert 112 is a "cylinder having open ends" (column 7, line 16). Such a configuration is completely different from the claimed arrangement which includes a "number of turbulence bars.....equidistantly spaced around said inner surface...". The arrangement described in the '494 reference forms a continuous partition between the condensate and the inner surface of the dryer shell as clearly illustrated in Fig. 12A, 13A, 12B and particularly 13B. Fig 13B shows how the roll insert 112 defines valleys 130 which partition the condensate from the inner surface of the dryer by ridges 131.

Also, as claimed in claim 1, the number of such individual spaced cross machine bars is determined by a specific formula. Applicants are of the opinion that such formula was not achieved solely from the discovery of optimal values. Applicants are further of the opinion that this formula would not have been achieved through routine skill in the art. More specifically, the formula includes an average depth of said layer in inches (depth of condensate) In the cited '494 reference, it would be extremely difficult to determine the average depth of the condensate because the condensate is contained within the valleys 130.

Furthermore, regarding the examiner's rejection based on the '494 reference to Salminen, Applicants would bring to the examiner's attention that Salminen specifically states that one of the objects of his invention is the overall consideration of optimizing (maximizing) the heat transfer (col. 4, line 7). The distinction between "maximizing" and "minimizing" the heat transfer rate is most significant. In the prior art, it was not recognized that a low heat transfer rate could be achieved while at the same time maintaining cross-machine direction temperature profile uniformity. Indeed, no prior art data has been presented in either the patent art or in the trade art that would illustrate the aforementioned concept. Further, the Salminen configuration does not use a series of axial bars that generate turbulence by resonant action, but rather uses a series of ribs on which the steam can condense. This mechanism is distinctively different from the subject invention and indeed does not even reference any patent on spoiler bars, despite the late (1994) application date. The '494 reference further has focused attention on maintaining a high heat transfer rate when the roll is not rotating. Further, the Salminen patent does not give any indication of the equation for optimizing the heat transfer to achieve either a high or a low heat transfer rate and good profile uniformity.

Consequently, Applicants are of the opinion that claim 1 clearly defines a nonobvious improvement over the applied '494 reference and should be allowable thereover.

Also, claims 2-3 and 5-11 are dependent on claim 1 and recite further nonobvious features over the cited reference and should therefore be allowable.

Claim 12 recites a unique use of "quarter-resonance" to achieve previously unexpected results

including uniform heat transfer together with low heat transfer rates. The applied '494 reference does not teach or suggest the aforementioned nonobvious feature.

Therefore, Applicants are of the opinion that claim 12 recites nonobvious subject matter over the applied '494 reference and should be allowable thereover.

Claim 13 is dependent on claim 12 and recites further nonobvious features over the cited reference and should therefore be allowable.

Claims 1-13 have been rejected under 35 U.S.C. 103(a) as being unpatentable over US 3,217,426.

US Patent 3,217,426 to Barnscheidt et al discloses a mechanical system of bars and hoops, but he does not teach either the optimization of the bar count and condensate depth required for optimum heat transfer or the minimization of heat transfer with simultaneous improvement in cross machine temperature profile as claimed in claim 1.

Consequently, Applicants are of the opinion that claim 1 clearly defines a nonobvious improvement over the applied '426 reference and should be allowable thereover.

Also, claims 2-11 are dependent on claim 1 and recite further nonobvious features over the cited reference and should therefore be allowable. Claims 18-20 and 22-24 have been canceled.

Claim 12 recites a unique use of "quarter-resonance" to achieve previously unexpected results including uniform heat transfer together with low heat transfer rates. The applied '426 reference does not teach or suggest the aforementioned nonobvious feature.

Therefore, Applicants are of the opinion that claim 12 recites nonobvious subject matter over the applied '426 reference and should be allowable thereover.

Claim 13 is dependent on claim 12 and recites further nonobvious features over the cited reference and should therefore be allowable.

Claims 14 has been rejected under 35 U.S.C. 103(a) as being unpatentable over US 3,217,426 as applied to claim 12 and further in view of US 4,478,168.

The Wimmer patent is for a door brace and alarm system and not related to heat transfer in dryer drums. One skilled in the art would not combine this patent with that of Barnscheidt, as they are in totally unrelated fields. This point, however, is not very important, as the use of tube bars is not the fundamental concept of this invention, but rather is a further feature that is incorporated in the preferred embodiment of the present invention.

Still further, the examiner states in his comments in his Response to Arguments, "The surfaces of items 12 and 8 of the primary references influence heat transfer as it is well known in the art to rib surfaces to influence heat transfer and the rotation of the shell would inherently cause turbulence".

This comment is correct insofar as it pertains to heat transfer through conventional ribbed surfaces (such as heat exchangers and finned coils) and the desire to have increased turbulence for promoting heat transfer. One of ordinary skill, however, would not consider using a concept that was known to increase turbulence if the objective was to reduce heat transfer.

Additionally, the following arguments in support of the allowability of the claims was presented in Amendment "A":

US 4,478,168 to Wimmer discloses a hollow bar which is lightweight. The '168 reference does not in any way relate to turbulator bars for a dryer.

The features of the present invention as recited in claim 14 which is dependent from claim 12 is the unique use of quarter-resonance to achieve previously unexpected results including uniform heat transfer together with low heat transfer rates.

The combined teachings of the '426 and the '168 reference fail to teach the aforementioned features.

Furthermore, there is no suggestion that would incline a person of ordinary skill in the art to combine the teachings of the '426 reference which relates to a dryer with the '168 reference which describes a door brace alarm.

Therefore, Applicants are of the opinion that claim 14 recites a non obvious improvement over the

applied references and should be allowable thereover.

Claims 14 has been rejected under 35 U.S.C. 103(a) as being unpatentable over US 3,217,426 as applied to claim 12 and further in view of US 7,028,756.

US 7,028,756 to Ives teaches hollow bars.

The feature of the present invention as recited in claim 14 which is dependent from claim 12 is the unique use of quarter-resonance to achieve previously unexpected results including uniform heat transfer together with low heat transfer rates.

The aforementioned feature is not taught by the '426 or the 756 reference. Accordingly, Applicants are of the opinion that claim 14 defines nonobvious subject matter over the combined teachings of the applied references and should be allowable thereover.


Reexamination and reconsideration of the claims as amended is requested.

By this amendment, Applicant introduces new arguments regarding the allowability of the claims rejected by the Examiner. Claims 1-16 remain in this application.

Applicant hereby files a Request for Continued Examination and files herewith the required fee for such RCE.

Allowance of claims 1-16 is earnestly solicited.

Respectfully submitted,

A handwritten signature in cursive script, reading "David J. Archer". The signature is written in dark ink and is positioned above the printed name.

David J. Archer

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Applicants representative.